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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,679

12/16/2005

Franck Fournel

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Brinks Hofer Gilson & Lione
PO Box 10395
Chicago, IL 60610

EXAMINER

AFTERGUT, JEFF H

ART UNIT

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08/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,679	Applicant(s) FOURNEL ET AL.	
	Examiner Jeff H. Aftergut	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The Office action to follow includes consideration of the preliminary amendment dated June 2, 2005 which previously was misplaced (not in the file) but which was evidently submitted by applicant. The time period for response to this Office action is reset herewith.

Claim Rejections - 35 USC § 102/103

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 7-9, 17, 19, and 34 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hoshi et al.

Hoshi et al suggested that those skilled in the art at the time the invention was made would have warped both a first and second wafer (inducing a stress in the wafer prior to assembly of the wafers together). The reference taught that one could have warped only one of the wafers prior to assembly. The reference taught that the wafers were mechanically warped prior to assembly. After the wafers were warped, they were brought into contact with each other at a single location and then allowed to contact at all surfaces therefrom. While the reference did not express that the finished assembly had a predetermined stressed state in the finished assembly, one skilled in the art

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would have readily understood that in order to ensure that the finished assembly retained its flat configuration, the final stresses induced in each wafer must be equal and opposite or balanced in the finished assembly in order to retain their flat configuration. It is therefore believed that the processing in accordance with Hoshi would have inherently resulted in the finished stressed assembly as required of the claim (it performed the same processing upon the same materials so therefore it must act in a similar fashion). In any event, it would have been obvious to one of ordinary skill in the art at the time the invention was made to impart a prestress to the assembled wafers which balanced each other out as such would have been necessary in order to produce a flat bonded wafer assembly in the process as taught by Hoshi et al.

With regard to claim 2, note that the reference to Hoshi et al suggested that one skilled in the art would have warped both wafers. Regarding claim 3, note that the reference taught that one could additionally only warp one wafer. It should be noted that both wafers are warped independent of one another. With respect to claims 7-9, note that the reference to Hoshi suggested that vacuum would have been employed to deform the wafers prior to the assembly of the same where the vacuum was applied about the exterior of the form onto which the wafers were deformed. Regarding claims 17 and 19, the two surfaces are molecularly bonded together and thus the air is prevented from being trapped between the wafers. With respect to claim 34, note that the processing took place in a controlled environment (under vacuum).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 7-9, 17, 19, 23, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshi et al in view of Feijoo et al (the article entitled "Prestressing of Bonded Wafers" submitted by applicant).

The reference to Hoshi et al is discussed at length above in paragraph 3 and applicant is referred to the same for a complete discussion of the reference. The reference did not expressly state or suggest that the wafer was prestressed in the processing as defined, however one skilled in the art would have readily understood that the wafer would have been prestressed by such processing as evidenced by Feijoo et al. The applicant is advised that Feijoo et al evidenced that those skilled in the art would have understood that imposing a curvature upon the discs in the manner described by Hoshi et al would have resulted in an assembly of discs having the prestresses as defined in the claim. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ a prestressing operation in order to bond wafers together wherein the wafers were bent prior to assembly as taught by Hoshi et al and wherein such assembly necessarily resulted in prestressing of the assembly as taught by Feijoo et al. Regarding claim 23, it is not clear what is meant by "flow layer". Since the wafers are joined one skilled in the art would have understood that it would have

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been desirous to include any and all necessary means to facilitate the same and such would have included a flow layer therein. Regarding claim 35, note that those skilled in the art would have selected a suitable gas in the bonding operation which was inert to the materials being bonded and the use of hydrogen is taken as conventional for such bonding processes.

6. Claims 4-6, 10-12, 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further taken with Nokozato et al.

While the reference to Hoshi et al suggested that both wafers would have been curved in the processing described therein, they failed to make mention of the use of curing wherein one wafer was concave and the other wafer was convex prior to assembly of the wafer components together in a bonding operation. However, prestressing the wafers in this manner was known as evidenced by Nokozato et al. More specifically, applicant is referred to the Figures 1(A) and 1(B) of Nokozato et al where the wafers were warped in the manner defined and joined together. It should be additionally noted that the reference taught that subsequent to the bonding operation one skilled in the art would have subjected the assembly to wafer thinning as was commonplace in the art in order to provide a handle wafer and a wafer to be machined. Applicant is referred to Figure 1(C) and the associated discussion of the same. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the techniques of Nokozato et al to deform the wafers prior to assembly of the wafers together whereby the wafers were prestressed as a result of the deformation

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prior to bonding as taught therein in the process of bonding wafers together as taught above in paragraph 5.

7. Claims 13-16, 18 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further taken with Satoh et al.

The references as set forth above in paragraph 5 suggested the overall operation but failed to teach that those skilled in the art would have applied mechanical forces to the wafers, but failed to express such was provided with a porous resilient mold member onto which the wafers were disposed in processing. However, rather than using a rigid member with vacuum, it was known at the time the invention was made to utilize a form onto which the wafer was held in a bonding operation which included a porous member through which them vacuum was applied as taught by Satoh et al. certainly, one skilled in the art at the time the invention was made would have understood that a suitable means to hold the wafers included a porous support which was formed from flexible material (such as a porous foam) when practicing the process as set forth above in paragraph 5 for making a bonded wafer assembly. It should be noted that the reference to Satoh additionally suggested application of pressure at the center of the disc arrangements in the bonding operation with a pin 95 which pressed the layers together and such is deemed to satisfy the piercing of claims 20-22 as defined.

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8. Claims 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further taken with either one of Shimbo or Black.

The references as set forth above in paragraph 5 suggested the overall operation, however there is no indication one skilled in the art would have performed a heat treatment upon the substrates after the joining operation. the references to Shimbo and Black et al suggested that those skilled in the art at the time the invention was made would have known to apply a heat treatment to the bonded wafer assembly in order to increase the bond strength of the assembly (improve the bond). Note that Black suggested such heat treatment in an annealing operation while the reference to Shimbo expressed a heat treatment after contacting to improve the bond integrity. It is taken as conventional in the art to heat the work holders in order to heat the substrates therein in the bonding operation. It would have been obvious to one of ordinary skill in the art at the item the invention was made to utilize the techniques of either one of Shimbo or Black wherein the assembled wafers were heat treated in order to increase the bond strength and remove air voids from between the wafers after bonding in the operation of bonding wafers together as taught by the references as set forth above in paragraph 5.

9. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further taken with Purdes.

The references as set forth above in paragraph 5 suggested the overall operation but failed to teach that those skilled in the art would have grown a layer upon the prestressed assembly. The reference to Purdes suggested that those skilled in the art

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would have grown a layer upon a wafer which was prestressed prior to the growth of the layer in order to compensate for differences in the grown layer and the wafer upon which it was grown. By prestressing the wafer prior to growth of the epitaxial layer thereon, one was able to grow crystal thereon with greater effectiveness. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the prestressed assembly of the references as set forth above in paragraph 5 to form a epitaxial growth thereon as such was known to have been a useful substrate assembly for the same as taught by Purdes.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-35 are provisionally rejected on the ground of nonstatutory

obviousness-type double patenting as being unpatentable over claims 1-27 of

copending Application No. 10/538,482. Although the conflicting claims are not identical,

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they are not patentably distinct from each other because the method of making the complex assembly is the same in both applications whether one disassociates the assembly from each other or not and thus the claimed subject matter of 10/538,482 is of a similar scope to that of the claims herein and overlap in terms of breath.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Aftergut whose telephone number is 571-272-1212. The examiner can normally be reached on Monday-Friday 7:30-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 571-272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Jeff H. Aftergut/
Primary Examiner
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JHA
August 5, 2008